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U. S. DEPT. OF AGRICULTURE

## FORESTRY AND EROSION

A radio talk by Mr. H. N. Wheeler, United States Forest Service, delivered through Station WRC and 35 other stations associated with the National Broadcasting Company, March 18, 1930.

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Erosion of soil and the forestry problem of the nation are so clearly related that one cannot be fully discussed without mentioning the other. This is no fairy story, and deals with a question of the greatest concern to every one. Speaking of fairy stories -- Little Daughter asked Mother to tell her a fairy story before she went to bed. Mother says "No, daughter, just wait till daddy comes home and he will tell us both one." But to the big problem. Erosion is caused by removal of timber, brush, and sod from steep hillslopes, by improper cultivation of soil, by overgrazing, by fire, and by ground squirrels and prairie dogs that eat grass and other vegetation so closely as to cause an overgrazed condition. These rodents also dig holes, loosening the soil and thus making erosion easy.

Millions of tons of earth are yearly being washed from fields, hills, and mountain sides, or torn from stream banks, leaving behind waste idle acres, no longer able to produce worth-while farm crops. Rivers and creeks are cutting away rich farm land, widening the stream beds, leaving behind barren, gravelly waste stretches, not even of value for pasture. It would have been much better for all concerned if the steep hill and mountain slopes had been left in native sod or covered with timber, as the case may be. It is not too late to prevent further clearing of lands too steep for farming and the time is here to begin repairing the damage. In many localities the badly eroding places can be sodded and used as meadow or pasture, and terracing and contour plowing will prevent much further washing and may actually bring back to profitable cultivation some of the waste acres. Stream banks can be held by expensive cribbing and revetments, or planting to grass may be generally helpful. But for the most part, erosion has gone too far to reclaim these lands for general farming purposes. Can we not act before the situation is beyond remedy? Not like the bell boy who rushed up to the hotel clerk and said the man in room 39 just hung himself. The clerk said, "Did you cut him down?" "No," said the boy, "he wasn't dead yet."

In the past twenty years, eighteen million acres of land east of the Great Plains, once farmed, have been abandoned, and the area is increasing each year in every State. The great bulk of this waste land never was suitable for raising farm crops at a profit, and will each year prove a greater burden upon the individual owner as well as a menace to the welfare of the community, the State, and the nation. Shall we then continue to clear land not suited to farming and later abandon it?

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No one can afford to pay taxes, even small taxes, on land unless it returns a profit or has a probable future value. No dairyman would long keep a cow in his herd that would not produce enough butter fat to pay for her feed, keep, and bring in a profit. So, too, land must give promise of some financial return. The individual owners of these gullied, washed, eroded lands lose, but the loss to the community and State may be very great indeed because of wholesale abandonment of farm lands. In some places the earth is washed away, down to solid rock or gravel, so its value for raising farm crops is gone for all time, and even its use for timber is seriously impaired, so it will never support so many people as it has in the past. The first earth to wash away is the organic matter, decayed leaves, twigs, grass roots, leaf mold, so when clay and sand is finally exposed the yield of the land is much reduced; also, the clay soil thus exposed erodes faster. The value of the soil itself washed away each year in the United States is estimated at \$200,000,000.

But what of the soil, dirt if you please, that has been washed away? It helps the water to grind out more soil; makes the flood bigger, in some cases making up one-half the volume of the flood; clogs up streams; and fills reservoirs. There are acres in Texas and north-east Missouri losing forty tons and more of earth each year, and in thousands of other places the loss is almost as great. Twenty-five acres of a city reservoir in southern California were filled with silt by <sup>heavy</sup> one rain, after a bad fire had denuded the hills above it, and a twenty-two-year-old reservoir in New Mexico is now filled with silt. The constant dredging of streams is a great economic burden upon all industry, and no scheme has yet been devised to economically remove this silt from reservoirs.

One very serious result of erosion is that the muddy, silt-burdened water flows over the surface of the land, some of it sinks into the soil, the pores of the ground become filled and clogged with small particles of earth so less and less water will go into the ground, and flowing from the surface will increase the flood menace, while also depriving the earth of the necessary ground water. Frank Porter, of Sprague, West Virginis, says:

When soils erode in all our land  
The loss is great on every hand;  
When trees are cut and leaves are gone,  
The hills stand out all bare and lone;  
Then farmers bear a heavy load,  
When fields wash down and soils erode.

The situation is not hopeless, but calls for heroic measures. The great bulk of this eroded land will produce timber. The landowner, whether small farmer or large land holder, may plant grass, shrubbery, and trees to prevent the washing of the soil, but right trees properly planted will eventually produce a profit from this otherwise worthless soil. And trees planted in gullies, on clay and gravelly hill tops and slopes will prevent further washing, or placed along stream banks will hold the earth from going downstream and will prove less expensive than artificial rock and timber cribbing. On a big stream it may be necessary



to make revetments of willow, since the heavy current may tear out the big trees. Part of these stream-bank trees can be cut as they mature, provided young trees are left or others are planted to replace them.

Leaves, twigs, and decaying wood build up the soil, but they also form a blanket that keeps the earth moist, and causes the rain and snow water to percolate slowly into the ground. Tree roots do more than just hold the soil in place, for they keep the earth porous and loose so the water not only sinks in to feed the tree itself, but also becomes the ground water, which comes out in the form of springs or is drawn out from wells for our domestic use, or is used by the tree in bringing food to the leaves. Great quantities of this water pass out from the leaves into the air. An average hardwood tree will throw off 500 barrels of water in a growing season and a pine tree will release from its needles two barrels every twenty-four hours. This water thus released into the air comes down again as rain. Thus trees play an important part in climatic regulation. Investigators tell us only two-ninths of the rainfall in the interior part of our country comes from the ocean or gulf. The rest is made up of water evaporating after rain or from lakes, streams, and fields, and what comes from this water transpiring from leaves of growing trees, shrubs, and plants.

A Forest Service study shows that were all the acres timbered that should be in trees on the lands draining into the Mississippi River and its tributaries, the peak of the river flood would be fully 4-1/2 feet less than it now is, in a major flood, and millions of tons of soil would be kept out of the stream.

Small landowners cannot be depended upon to control the situation even though it might prove profitable for them to do so. The Weeks Law and later the Clarke-McNary Act makes it possible for the Government to purchase lands for reforestation on the head-waters of our streams. There are national forests in the West protecting some watersheds, and land is being bought under the Acts mentioned and placed in national forests. And State, county and town forests are being created. But this is not sufficient to overcome the erosion menace. Many more millions of acres, both east and west, must be placed in National, State, county, town, and city forests, and a great planting program must be inaugurated. Timber must be grown to supply our needs of wood products, but more than that, desert conditions similar to those in China and other Asiatic, African, and European countries must be avoided. This means that all land not suitable for farming or needed for cities, highways, and other uses must be kept in timber, or if idle and waste, must be brought back into timber, and the millions of eroded, waste acres must again raise trees. Tree planting is not all that is necessary, but fire must be kept out of the woods and even from the grassy areas, especially on steep slopes, and even heavy grazing must be stopped, and burrowing rodents destroyed.

Even the deep cuts along railroad rights-of way and auto roads should be planted to grass, shrubs, and even trees, incidentally to beautify the country, but primarily to hold the soil in place. Much of the wooded country will reforest naturally if fire is kept out, but tree planting on eroding lands above city, power, and irrigation reservoirs is

necessary. Watersheds have a tangible value. The ground cover of trees and brush on the southern California National Forests is valued at from \$900 to \$1600 per acre, for without them as water regulations and soil protectors, the great crops of citrus fruits, vegetables, and ordinary farm produce could not be raised and sand would be washed on to the good soil, and the whole would return to desert conditions. Few things are more desolate and distressing to look upon than eroded, gullied, deserted farm lands, or barren waste, fire-scarred, overgrazed plains or hill-slopes. Can you visualize the change from the picture of a countryside where there are now these unsightly, eroded, gullied, gashed, hillslopes and ugly clay or sand banks along railroads and highways, to one covered with beautiful green trees or flowering shrubs and plants, lending a charm of beauty to the landscape and furnishing shade from the glare of the midsummer sun, or a protecting shelter to man, bird, and beast from wild winds and winter blizzards, a rest to tired eye and brain, a haven of refuge to the weary soul. Let us then in our community and State make this picture a reality by clothing these unsightly spots with trees.